MARINE ECOLOGY
PROGRESS SERIES

Volume 24 (1985)

Editor
Otto Kinne

Ecology Institute
Nordbünte 23 and 30, D-2124 Oldendorf/Luhe
Federal Republic of Germany

IR
Inter-Research
1985

Advisors

Advisors to 'Marine Ecology – Progress Series' are appointed for a four-year period. They are expected to:

- ○ critically evaluate the scientific merits of manuscripts submitted for publication
- ○ suggest topics and authors for reviews
- ○ select and present suitable high-quality manuscripts
- ○ draw attention to new facts, concepts and methods

In addition to the advisors listed below, about 300 referees cooperate anonymously.

ENVIRONMENTAL FACTORS

Alderdice, D., Dr.
Pacific Biological Station, Nanaimo, B.C. V9R 5K6, Canada
Responses to environmental stress

Dring, M. J., Dr.
Botany Dept, The Queen's Univ. of Belfast, Belfast BT7 1NN, Northern Ireland
Physiological ecology of algae

Fowler, S. W., Dr.
International Laboratory of Marine Radioactivity, Musée Océanographique, MC 98000 Monaco
Environmental effects on invertebrates

Gunkel, W., Dr.
Biologische Anstalt Helgoland, D-2192 Helgoland, Federal Republic of Germany
Environmental effects on bacterial growth

Haedrich, R. L., Prof.
Memorial University of Newfoundland, St. John's, Nfld. A1B 3X9, Canada
Environmental effects on fishes

Lawrence, J., Prof.
Dept of Biology, Univ. of South Florida, Tampa, Fla 33620, USA
Physiological ecology of invertebrates

MacLeod, R. A., Prof.
Dept of Microbiology, MacDonald Campus of McGill Univ., MacDonald College, Que. H9X 1C0, Canada
Physiological ecology of microorganisms

Meyers, S., Prof.
Dept of Food Science, Louisiana State Univ., Baton Rouge, LA 70803, USA
Physiological ecology of microorganisms

Morita, R. Y., Prof.
Dept of Microbiology, Oregon State Univ., Corvallis, Oreg. 97331, USA
Environmental effects on microorganisms

Newell, R. C., Prof.
Institute for Marine Environmental Research, Prospect Place, The Hoe, Plymouth PL1 3DH, England
Environmental relations of intertidal animals

Rheinheimer, G., Prof.
Institut für Meereskunde, Univ. Kiel, Düsternbrooker Weg 20, D-2300 Kiel, Federal Republic of Germany
Environmental effects on microorganisms

Riisgård, H. U., Dr.
Odense Universitet, Biologisk Institut, Campusvej 55, DK-5230 Odense M., Denmark
Environmental effects on invertebrates

Scheltema, R. S., Dr.
Woods Hole Oceanographic Institution, Woods Hole, MA 02543, USA
Biogeography and evolution of benthic invertebrates

Segal, E., Prof.
Dept of Biology, California State Univ., Northridge, Calif. 91330, USA
Physiological ecology of invertebrates

Sidell, B. D., Prof.
Dept of Zoology, Univ. of Maine at Orono, Murray Hall, Orono, ME 04469, USA
Physiological ecology of fishes

Southward, A. J., Dr.
The Laboratory, Citadel Hill, Plymouth PL1 2PB, England
Environmental effects on invertebrates

Vernberg, J., Prof.
Belle W. Baruch Institute for Marine Biol. and Coastal Res., Univ. of South Carolina, Columbia, S. C. 29208, USA
Physiological ecology of invertebrates

Winter, J. E., Dr.
Instituto de Zoología, Univ. Austral de Chile, Casilla 567, Valdivia, Chile
Physiological ecology of invertebrates

Woodhead, D. S., Dr.
Ministry of Agriculture, Fisheries and Food, Fisheries Radiobiological Lab., Hamilton Dock, Lowestoft, Suffolk NR32 1DA, England
Effects of radioactivity

ZoBell, C. E., Prof.
Scripps Institution of Oceanography, San Diego, P.O.B. 1529, La Jolla, Calif. 92093, USA
Environmental effects on microorganisms

PHYSIOLOGICAL ECOLOGY

Bayne, B. L., Dr.
Institute for Marine Environmental Research, Prospect Place, The Hoe, Plymouth PL1 3DH, England
Comparative physiology

Beardmore, J. A., Prof.
Univ. College of Swansea, Dept of Genetics, Singleton Park, Swansea SA2 8PP, U.K.
Adaptation; selection

Bonotto, S., Prof.
Centre d' Etude de l'Energie Nucléaire, Lab. du C.E.N./S.C.K., B-2400 Mol, Belgium
Cellular biology and sexuality

Bulnheim, H.-P., Prof.
Biologische Anstalt Helgoland, Palmaille 9, D-2000 Hamburg 50, Federal Republic of Germany
Metabolic performance of invertebrates; reproductive biology and sexuality

Costlow, J. D., Jr., Prof.
Duke University Marine Laboratory, Pivers Island, Beaufort, N.C. 28516, USA
Developmental physiology; endocrinology

Enright, J. T., Prof.
Scripps Institution of Oceanography, San Diego, P.O.B. 1529, La Jolla, Calif. 92093, USA
Biological rhythms

Fisher, N. S., Dr.
International Laboratory of Marine Radioactivity, Musee Oceanographique, 9800 Monaco
Physiological ecology of phytoplankton

Gerking, S. D., Prof.
Dept of Zoology, Arizona State Univ.,Tempe, Arizona 85281, USA
Fish physiology

Holland, N. D., Dr.
Scripps Institution of Oceanography, San Diego, P.O.B. 1529, La Jolla, Calif. 92093, USA
Comparative, cellular and developmental physiology

Humphrey, G. F., Dr.
CSIRO Marine Biochemistry, Building A12, Sydney Univ., N.S.W. 2006, Australia
Photosynthesis; plankton biochemistry

Levandowsky, M., Dr.
Haskins Laboratories at Pace Univ., 41 Park Row, New York, N.Y. 10038, USA
Chemosensory mechanisms

Naylor, E., Prof.
School of Animal Biology, Univ. Coll. North Wales, Bangor, Gwynedd, LL57 2UW, U.K.
Behavioural physiology

Paasche, E., Dr.
Dept of Biology, Univ. Oslo, Marine Botany, P.O.B. 1069, Blindern, N-0316 Oslo 3, Norway
Physiological ecology of phytoplankton

Puiseux-Dao, S., Prof.
Laboratoire de Cytophysiologia végétale et de Toxicologie cellulaire, Université de Paris VII, 2, Place Jussieu, F-75251 Paris, France
Ecophysiology and toxicology of algae

Reed, R. H., Dr.
The University of Dundee, Dept of Biological Sciences, Dundee DD1 3HN, United Kingdom
Physiological ecology of algae and cyanobacteria

Siebers, D., Dr.
Biologische Anstalt Helgoland, Palmaille 9, D-2000 Hamburg 50, Federal Republic of Germany
Comparative biochemistry and physiological ecology of invertebrates

Zhirmunsky, A. V., Prof.
Institute of Marine Biology, Vladivostok 690022, USSR
Mechanisms of cellular resistance and control

CULTIVATION

Bardach, J. E., Prof.
East-West Resources Systems Institute, The East-West Center, 1777 East-West Road, Honolulu, Hawaii 96848, USA
General aspects of cultivation; aquaculture

Bonotto, S., Prof.
Centre d'Étude de l'Énergie Nucleaire, Lab. du C.E.N./S.C.K., B-2400 Mol, Belgium
Cultivation of multicellular algae including aquaculture

Lawrence, J., Prof.
Dept of Biology, Univ. of South Florida, Tampa, Fla 33620, USA
Nutrition of invertebrates

Levandowsky, M., Dr.
Haskins Laboratories at Pace Univ., 41 Park Row, New York. N.Y. 10038, USA
Microcosm cultures

Magne, F., Prof.
Univ. de Paris VI, Inst. de Biologie Végétale, UER 59, 7, Quai Saint-Bernard, F-75230 Paris, Cedex 05, France
Cultivation of algae, excluding aquaculture

Meyers, S. P., Prof.
Dept of Food Science, Louisiana State Univ., Baton Rouge, LA 70803, USA
Cultivation of microorganisms and crustaceans; aquaculture

Paffenhöfer, G.-A., Prof.
Skidaway Institute of Oceanography, Univ. System of Georgia, P.O.B. 13687, Savannah, Georgia 31406, USA
Cultivation of zooplankton

Pandian, T. J., Prof.
School of Biological Sciences, Madurai Kamaraj Univ., Madurai 625 021, Tamilnadu, India
Cultivation of decapods and fishes; Bioenergetics

Rheinheimer, G., Prof.
Institut für Meereskunde, Univ. Kiel, Düsternbrooker Weg 20, D-2300 Kiel, Federal Republic of Germany
Cultivation of microorganisms

Rosenthal, H., Dr.
Biologische Anstalt Helgoland, Palmaille 9, D-2000 Hamburg 50, Federal Republic of Germany
Cultivation of and environmental effects on fishes

Ryther, J. H., Dr.
Center for Marine Biotechnology, Harbor Branch Institution, RR 1, Box 196 A, Ft. Pierce, Fla 33450, USA
Cultivation of aquatic plants

Sindermann, C. J., Dr.
U.S. Dept of Commerce, NOAA, National Marine Fisheries Service, Northeast Fisheries Center, Sandy Hook Lab., Highlands, N. J. 07732, USA
Aquaculture; effects of diseases

Syrett, P., Prof.
University of Wales, Singleton Park, Swansea, Wales, U.K.
Ecological physiology of phytoplankton

Tseng, C. K., Prof.
Institute of Oceanology, Academia Sinica, 7 Nan-Hai Road, Qingdao, People's Republic of China
Aquaculture of seaweeds

Ukeles, R., Dr.
U.S. Dept of Commerce, NOAA, National Marine Fisheries Service, Northeast Fisheries Center, Milford Lab., 212 Rogers Ave, Milford, Conn. 06460, USA
Cultivation of unicellular algae

Westernhagen, H. von, Dr.
Biologische Anstalt Helgoland, Palmaille 9, D-2000 Hamburg 50, Federal Republic of Germany
Cultivation of crustaceans and fishes

Winter, J. E., Dr.
Instituto de Zoología, Univ. Austral de Chile, Casilla 567, Valdivia, Chile
Cultivation of invertebrates

ZoBell, C. E., Prof.
Scripps Institution of Oceanography, San Diego, P.O.B. 1529, La Jolla, Calif. 92093 USA
Cultivation of microorganisms

DYNAMICS

Arndt, E. A., Prof.
Wilhelm-Pieck-Universität Rostock, Sektion Biologie, Freiligrathstr. 7/8, DDR-2500 Rostock, German Democratic Republic
Ecological dynamics of brackish waters

Bak, R. P. M., Dr.
Nederlands Instituut voor Onderzoek der Zee, Postbox 59, Den Burg – Texel, The Netherlands
Coral-reef ecology

Banse, K., Prof.
Dept of Oceanography, Univ. Washington, Seattle, Wash. 98195, USA
Biological oceanography; plankton research

Berman, T., Prof.
Israel Oceanographic & Limnological Research Ltd., Tel Shikmona, P.O.B. 8030, Haifa 31080, Israel
Phytoplankton ecology

Bianchi, A., Dr.
Centre Nat. Rech. Scient. Ecologie et Biochimie Microbiennes du Milieu Marin, ER 223 3, Place Victor Hugo, F-13331 Marseille, France
Marine microbiology

Birkeland, C., Prof.
Univ. of Guam, Marine Laboratory, UOG Station, Mangilao, GUAM 96913
Coral-reef ecology

Bonner, W. N., Mr.
British Antarctic Survey, High Cross Madingley Rd, Cambridge CB3 OET, England
Polar ecology

Bunt, J. S., Dr.
Australian Institute of Marine Science, P M B No. 3, Townsville M.S.O., Q. 4810, Australia
Mangrove systems; reef studies

Conover, R. J., Dr.
Marine Ecology Laboratory, Bedford Institute of Oceanography, P.O.B. 1006, Dartmouth, N.S. B2Y 4A2, Canada
Zooplankton biology

Cushing, D. H., Dr.
Ministry of Agriculture, Fisheries and Food, Fisheries Laboratory, Lowestoft, Suffolk NR33 OHT, England
Productivity of the sea; fish-population dynamics

Fenchel, T., Prof.
Institute of Ecology and Genetics, Univ. of Aarhus, Ny Munkegade, Building 550, DK-8000 Aarhus C, Denmark
Population biology; microbial ecology

Field, J. G., Prof.
University of Cape Town, Zool. Dept, Rondebosch 7700, Republic of South Africa
Dynamics of nearshore ecosystems

Fishelson, L., Prof.
Dept of Zoology, Tel-Aviv Univ., Tel-Aviv, Israel
Population dynamics in shallow-water benthic communities; adaptation

Floc'h, J. Y., Dr.
Lab. de Physiologie Végétale, Faculté des Sciences, Ave Victor le Gorgeau, F-29283 Brest, France
Nutrition of macroalgae

Fournier, R. O., Dr.
Dept of Oceanography, Dalhousie Univ., Halifax, N.S. B3H 4J1, Canada
Plankton dynamics in coastal ecosystems

Gage, J. D., Dr.
Dunstaffnage Marine Research Laboratory, P.O.B. 3, Oban, Argyll PA34 4AD, Scotland
Benthos of deep sea and temperate coasts

Gerlach, S. A., Prof.
Institut für Meereskunde, Düsternbrooker Weg 20, D-2300 Kiel, Federal Republic of Germany
Benthos ecology

Golikov, A. N., Dr.
Zoological Institute, Academy of Sciences, Leningrad, V-164, USSR
Dynamics of biocoenoses

Gray, J., Prof.
Institutt for Marinbiologi og Limnologi, Postboks 1064, Oslo, Norway
Soft-sediment ecology

Haedrich, R. L., Prof.
Memorial University of Newfoundland, St. John's Nfld. A1B 3X9, Canada
Zoogeography

Harding, G., Dr.
Marine Ecology Laboratory, Bedford Institute of Oceanography, P.O.B. 1006, Dartmouth, N.S. B2Y 4A2, Canada
Crustacean ecology

Harris, G. P., Dr.
CSIRO Marine Laboratories, Division of Fisheries Research, Division of Oceanography, Castray Esplanade, Hobart, Tas. 7000, Australia
Phytoplankton ecology: community structure, pollution dynamics, productivity

Hessler, R. R., Dr.
Scripps Institution of Oceanography, San Diego, P.O.B. 1529, La Jolla, Calif. 92093, USA
Deep-sea ecology

Hoagland, K. E., Dr.
Lehigh University, Center for Environm. Studies, Chandler-Ullmann Hall 17, Bethlehem, Pa 18015, USA
Ecology and evolution of molluscs

Hoek, C. van den, Prof.
Biol. Centrum der Rijksuniversiteit te Groningen, Afd. Plantensystematiek, Kerklaan 30, Haren (Gr.), The Netherlands
Phytogeography

Holm-Hansen, O., Dr.
Scripps Inst. of Oceanography, Univ. of Calif., La Jolla, Calif. 92093, USA
Polar ecology

Hughes, R. N., Dr.
School of Animal Biology, Univ. College North Wales, Bangor, Gwynedd, LL57 2UW, U.K.
Ecological energetics (particularly feeding)

Kühlmann, D., Dr.
Museum für Naturkunde der Humboldt-Univ., Invalidenstr. 43, DDR 104 Berlin, German Democratic Republic
Coral-reef ecology

Lawrence, J., Prof.
Dept of Biology, Univ. of South Florida, Tampa, Fla 33620, USA
Reproduction of invertebrates

Levandowsky, M., Dr.
Haskins Laboratories at Pace Univ., 41 Park Row, New York, N.Y. 10038, USA
Ecological modelling; phytoplankton ecology

Levings, C., Dr.
West Vancouver Laboratory, 4160 Marine Drive, West Vancouver, B.C. V7V 1N6 Canada
Estuarine ecology of macrobenthos and fish

Lewis, J. B., Dr.
McGill University, 3620 University Street, Montreal, PQ H3A 2B2, Canada
Coral-reef ecology

Lewis, M. R., Dr.
Dept of Oceanography, Dalhousie University, Halifax, N. S. B3H 4J1, Canada
Biological oceanography; phytoplankton physiology

Mauchline, J., Dr.
Scottish Marine Biological Ass., Dunstaffnage Marine Res. Lab., P.O.B. 3, Oban PA34 4AD, Argyll, Scotland
Deep-sea ecology

Neushul, M., Dr.
Dept of Biological Sciences, Univ. of California, Santa Barbara, Calif. 93106, USA
Ecology of benthos algae

Newell, S. Y., Dr.
The University of Georgia, Marine Institute, Sapelo Island, Georgia 31327, USA
Ecology of fungi and bacteria

Nixon, Scott W., Prof.
Univ. Rhode Island, Graduate School of Oceanogr., Narragansett Bay Campus, Kingston, R.I. 02881, USA
Coastal ecology; nutrient dynamics; wetlands

Omori, M., Dr.
Tokyo University of Fisheries, Research Lab. of Fisheries Resources, 4-5-7, Konan, Minato-ku, Tokyo, 108, Japan
Biological oceanography, zooplankton

Paffenhöfer, G.-A., Prof.
Skidaway Institute of Oceanography, Univ. System of Georgia, P.O.B. 13687, Savannah, Georgia 31406, USA
Zooplankton ecology

Parsons, T. R., Prof.
Dept of Oceanography, Univ. of British Columbia, 6270 University Boulevard, Vancouver, B.C. V6T 1W5, Canada
Biological oceanography

Pearse, J. S., Prof.
Center for Coastal Marine Studies, Univ. of California, Santa Cruz, Calif. 95064, USA
Kelp forest ecology; Reproductive ecology

Peterson, C. H., Prof.
Institute of Marine Science, Univ. N. Carolina at Chapel Hill, 3407 Arendell Street, Morehead City, N. C. 28557, USA
Marine benthic ecology

Pichon, M., Dr.
James Cook Univ. North Queensland, Q. 4811, Australia
Coral-reef ecology

Platt, T., Dr.
Marine Ecology Laboratory, Bedford Institute of Oceanography, P.O.B. 1006, Dartmouth, N.S. B2Y 4A2, Canada
Phytoplankton ecology

Polikarpov, G. G., Prof.
Institute of Biology of South Seas, Academy of Sciences Uk. SSR, 2, Nahimov St., Sevastopol, 335000, USSR
Chemical ecology, radioecology, Radiotracers, pollution

Rao, T. S. S., Dr.
National Institute of Oceanography, Biol. Div., Dona Paula – 403 004, Goa, India
Biological oceanography

Reise, K.
Biologische Anstalt Helgoland, D-2282 List/Sylt, Federal Republic of Germany
Benthos ecology

Savidge, G., Dr.
The Queen's Univ. of Belfast, Marine Biology Station, The Strand, Protaferry, Co. Down, Northern Ireland
Phytoplankton ecology

Scarlato, O., Prof.
Zoological Institute, Academy of Sciences, Leningrad, V-164, USSR
Dynamics of biocoenoses

Scheltema, R. S., Dr.
Woods Hole Oceanographic Institution, Woods Hole, MA 02543, USA
Reproduction of benthic invertebrates

Skjoldal, H. R., Dr.
Institute of Marine Research, Postboks 1870, N-5011 Bergen-Nordnes, Norway
Food webs and trophic interactions

Southward, A. J., Dr.
The Laboratory, Cital Hill, Plymouth PL1 2PB, England
Rocky-coast ecosystems

Tenore, K. R., Prof.
Chesapeake Biological Laboratory, P.O.B. 38, Solomons, Maryland 20688-0038, USA
Benthic ecology and bioenergetics

Thayer, G. W., Dr.
Ecosystem Structure Branch, Southeast Fisheries Center, Beaufort, N. C. 28516-9722, USA
Wetlands ecology, incl. submerged seagrasses and emergent marshes

Tseng, C. K., Prof.
Institute of Oceanology, Academia Sinica, 7 Nan-Hai Road, Qingdao, People's Republic of China
Ecology of seeweeds

Underwood, A. J., Dr.
School of Biol. Sci., Univ. Sydney, Zoology Building, Sydney, N.S.W. 2006, Australia
Experimental intertidal and subtidal ecology

Vinogradov, M. E., Prof.
P. P. Shirshov Institute of Oceanology, Academy of Sciences of USSR, 1, Letnaya (Ljublino), Mocow 109387, USSR
Oceanic plankton ecosystems

Wangersky, P. J., Prof.
Dept of Oceanography, Dalhousie Univ., Halifax, N.S., B3H 4J1, Canada
Organic matter in sea water; theoretical population dynamics

Warwick, R. M., Dr.
Institute for Marine Environmental Research, Prospect Place, The Hoe, Plymouth PL1 3DH, England
Structure and functioning of benthic communities; meiofaunal ecology

Zijlstra, J. J., Dr.
Nederlands Instituut voor Onderzoek der Zee, Postbox 59, Den Burg – Texel, The Netherlands
Food webs; population dynamics

OCEAN MANAGEMENT

Alderdice, D., Dr.
Pacific Biological Station, Nanaimo, B.C. V9R 5KR, Canada
Organismic responses to pollution

Bardach, J. E., Prof.
East-West Resources Systems Institute, The East-West Center, 1777 East-West Road, Honolulu, Hawaii 96848, USA
Management of tropical marine environments; fisheries

Barnes, R. S. K., Dr.
Dept of Zoology, Univ. Cambridge, Downing Street, Cambridge CB2 3EJ, England
Management of coastline habitats

Bayne, B. L., Dr.
Institute for Marine Environmental Research, 67/69 Citadel Road, Plymouth PL1 3DH, England
Stress and pollution

Beardmore, J. A., Prof.
Univ. College of Swansea, Dept of Genetics, Singleton Park, Swansea SA2 8PP, U.K.
Genetic effects of pollution

Bernhard, M., Dr.
ENEA, P.O.B. 316, I-19100 La Spezia, Italy
Radioactive and conventional pollution

Bryan, G. W., Dr.
Marine Biological Ass. of the U.K., The Laboratory, Citadel Hill, Plymouth PL1 2PB, England
Heavy metal pollution

Eisler, R., Dr.
U.S. Dept of the Interior, Fish and Wildlife Service, Office of Biol. Services, Washington, D.C., 20240, USA
Toxicology and pollution

Ernst, W., Dr.
Institut für Meeresforschung, Am Handelshafen 12, D-2850 Bremerhaven-1, Federal Republic of Germany
Pollution due to organic chemicals

Fisher, N. S., Dr.
International Laboratory of Marine Radioactivity, Musee Oceanographique
Pollutant effects on plankton

Fowler, S. W., Dr.
International Laboratory of Marine Radioactivity, Museé Océanographique, MC 98000 Monaco
Pollution effects on zooplankton; radioecology

Gray, J., Prof.
Institutt for Marinbiologi og Limnologi, Postboks 1064, Oslo, Norway
Pollution effects on benthos animals

Gulland, J. A., Dr.
c/o International Institute for Environment and Development, 3 Endsleigh Street, London WC1H ODD, England
Management of fishery resources

Gunkel, W., Dr.
Biologische Anstalt Helgoland, D-2192 Helgoland, Federal Republic of Germany
Oil degradation; oil pollution

Lasker, R., Dr.
US Dept of Commerce, NOAA, Southwest Fisheries Center, P.O.B. 271, La Jolla, Calif. 92038, USA
Fishery biology; fishery resources

Mauchline, J., Dr.
Scottish Marine Biological Ass., Dunstaffnage Marine Res. Lab., P.O.B. 3, Oban PA34 4AD, Argyll, Scotland
Radioactive pollution

Riley, J. P., Prof.
Dept of Oceanography, Univ. of Liverpool, Liverpool L69 3BX, England
Marine pollution chemistry

Sherman, K., Dr.
US Dept of Commerce, NOAA, Northeast Fisheries Center, South Ferry Rd, Narragansett, R.I. 02882, USA
Fisheries ecology; fishery resources

Ukeles, R., Dr.
U.S. Dept of Commerce, NOAA, National Marine Fisheries Service, Northeast Fisheries Center, Milford Laboratory, 212 Rogers Ave, Milford, Conn. 06460, USA
Pollution effects on algae

Ursin, E., Dr.
The Danish Institute for Fishery and Marine Research, Charlottenlund Slot, DK-2920 Charlottenlund, Denmark
Ecosystem organization; species interactions of importance to fisheries

Zijlstra, J. J., Dr.
Nederlands Instituut voor Onderzoek der Zee, Postbox 59, Den Burg – Texel, The Netherlands
Management of wadden-sea areas

MARINE ECOLOGY – PROGRESS SERIES

HISTORY: 'Marine Ecology – Progress Series' (MEPS) was established in response to requests from numerous marine ecologists from all over the world. The series is based on 'Marine Ecology' – the first comprehensive, integrated treatise on life in oceans and coastal waters – conceived, organized and edited by Professor Otto Kinne, and published by John Wiley & Sons.

AIM: 'Marine Ecology – Progress Series' serves as a world-wide forum for all aspects of marine ecology, fundamental and applied. The journal covers microbiology, botany, zoology, ecosystem research, biological oceanography, fisheries, aquaculture, pollution, environmental protection, conservation and resource management.
Ecological research has become of paramount importance for man's future. The information presented here should, therefore, encourage critical application of ecological knowledge for the benefit of mankind and, in fact, of life on earth. 'Marine Ecology – Progress Series' strives for

- ◯ complete coverage of the field of marine ecology
- ◯ the highest possible quality of papers
- ◯ quick publication
- ◯ a high technical standard of presentation.

Editor and publisher attempt to achieve these goals in close cooperation with advisors, referees, contributors and readers. Criticism and advice are cordially invited (please address to the editor).

SCOPE: 'Marine Ecology – Progress Series' is international and interdisciplinary. Presenting research papers, reviews and notes, it has been created for prompt publication of contributions concerned with:

Environmental Factors: Tolerances and responses of marine organisms (microorganisms, autotrophic plants, and animals) to variations in abiotic and biotic components of their environment; radioecology.

Physiological Ecology: Synthesis and transversion of organic material (mechanisms of auto- and heterotrophy); thermo-, ion-, osmo- and volume-regulation; stress resistance; non-genetic and genetic adaptation; population genetics; orientation in space and time; migrations; behaviour.

Cultivation: Maintenance and rearing of, as well as experimentation with, marine organisms under environmental and nutritional conditions which are, to a considerable degree, controlled; analysis of the physiological and ecological potential of individuals, populations and species; determination of nutritional requirements; ecological aspects of aquaculture; water-quality management; culture technology.

Dynamics: Production, transformation, and decomposition of organic matter in marine ecosystems; food webs; trophic interrelations; population dynamics; plankton ecology; benthos ecology; estuarine and coastal ecology; wadden-sea ecology; coral-reef ecology; deep-sea ecology; open-ocean ecology; polar ecology; theoretical ecology; ecological modelling; evolution.

Ocean Management: Applied marine field ecology; inventory, protection and management of living resources in coastal areas, estuaries and open oceans; ecological aspects of fisheries; pollution of marine areas and organisms; protection of life in the seas; management of populations, species and ecosystems; management of coastal zones and sea areas.

Subscription

1984: 6 volumes (14–19), 3 issues per volume
North America: US $ 147 per volume.
Annual rate for 6 volumes: US $ 882 including postage, handling and insurance.

All other countries DM 266 per volume.
Annual rate for 6 volumes: DM 1596 plus postage, handling and insurance.

1985: 7 volumes (20–26), 3 issues per volume
North America: US $ 147 per volume.
Annual rate for 7 volumes: US $ 1029 including postage, handling and insurance.

All other countries DM 276 per volume.
Annual rate for 7 volumes: DM 1932 plus postage, handling and insurance.

Special Conditions (for personal use of individual scientists only)
(1) Advisors: free copies.
(2) Staff referees: DM 48 per volume, providing their institutional library subscribes to the journal.
(3) All other scientists: DM 85 per volume, providing their institutional library subscribes to the journal.
(4) Students: DM 75 per volume, providing their university library subscribes to the journal.

Subscriptions are entered with prepayment only.

Missing issues must be claimed within 4 months after publication.

Publisher: Inter-Research, P.O.Box 1120, D-2124 Amelinghausen, Federal Republic of Germany.

Advertisements

1/1 page	ready-to-print film	= US $ 70	1/2 page	ready-to-print film	= US $ 38
	proof-requiring text	= US $ 100		proof-requiring text	= US $ 60

Copyright © Inter-Research, Amelinghausen, 1985. All rights reserved. Mar. Ecol. Prog. Ser. 1985. Printed by Westholsteinische Verlagsdruckerei Boyens & Co., D-2240 Heide.

Manuscript Preparation, Mailing and Processing

Preparation

Research papers (in general not exceeding 10 printed pages), reviews (up to 30 printed pages) and notes (1–3 printed pages) must be typewritten with double spacing. 'Marine Ecology – Progress Series' invites interpretative rather than descriptive contributions. Reviews should be critical, instructive evaluations of the state-of-the-art – not mere compilations of information.

Abstracts. All contributions must be preceded by a brief, concise abstract. In the shortest possible way, the abstract should outline the scope of the paper and highlight its main results and conclusions.

Figures must be very carefully prepared, numbered and accompanied by brief, precise legends. For examples consult recent issues. Mark desired position of figures in the manuscript margin.

Tables should not be excessive in size. They must be numbered and be headed by brief, compendious legends. Mark desired position of tables in the manuscript margin. Unusual symbols used must be explained.

Genus and species names: underline for *italics*. Genus names should appear in full the first time mentioned in a given paragraph.

Citation of literature. All literature quoted in the text must be listed, in alphabetical order of author names, at the end of the manuscript. Please abbreviate publications according to 'World List of Scientific Periodicals', latest edition, London. For examples of literature citation see below.

Mailing

Address manuscripts (original plus 2 copies) to an advisor or to the editor. For safety use registered mail.

Processing

Manuscripts are critically evaluated by at least 3 reviewers. The editor then decides on acceptance or rejection. Acceptable manuscripts are usually returned to the author requesting consideration of comments and criticism. Present rejection rates range from 35 to 50 % for manuscripts from different parts of the world.

When an accepted manuscript is ready for publication, the author will be notified and the date of manuscript acceptance fixed. This date appears at the end of each printed contribution. Average time between acceptance and publication is 4 mo.

The author receives 2 sets of proofs directly from the printer. Printing errors must be carefully corrected. At this stage, stylistic changes are not acceptable without compensatory payment. Please return 1 set of proofs by air mail.

Offprints: Sixty offprints (reprints) of each contribution will be made available free of charge. Additional offprints can be purchased. For offprint prices consult the form accompanying the proofs. Orders for additional offprints must be made when returning the proof (use the form provided).

'Marine Ecology – Progress Series' levies no page charge.
The last issue of each set of 10 volumes features a combined author/title index.

Examples of Literature Citation

Periodicals

Gray, J. S., Pearson, T. H. (1982). Objective selection of sensitive species indicative of pollution-induced change in benthic communities. I. Comparative methodology. Mar. Ecol. Prog. Ser. 9: 111-119

Papers from serials/books

Margalef, R. (1978). General concepts of population dynamics and food links. In: Kinne, O. (ed.) Marine ecology, Vol. IV, Dynamics. Wiley, Chichester, p. 617-704

Books

Steele, J. H. (1974). The structure of marine ecosystems. Blackwell, Oxford

---

Copyright

With the acceptance of a manuscript, the copyright is transferred to the publishers. Reproduction of any part of this publication by any means, as well as translation, requires their written permission. Trade marks or names appearing in this series may be subject to protective regulations or laws. The Article Fee Code (at the bottom of the first page of each paper) indicates the copyright holder's consent that, in the USA, copies of the paper may be made for personal or internal use. This consent is granted on condition that the copier pay the stated fee through the Copyright Clearance Center, Inc. P.O.Box 8891, Boston, Mass. 02114, for copying beyond that permitted by Section 107 or 108 of the US Copyright Law.

CONTENTS

Volume 24 · Numbers 1 and 2 · 1985

RESEARCH PAPERS

Smith, W. G., Morse, W. W.
Retention of larval haddock *Melanogrammus aeglefinus* in the Georges Bank region, a gyre-influenced spawning area 1–13

Munk, P., Kiøboe, T.
Feeding behaviour and swimming activity of larval herring *(Clupea harengus)* in relation to density of copepod nauplii 15–21

Green, J. M., Martel, G., Kingsland, E. A.
Foraging time allocation in a territorial fish: influence of reproductive activities 23–26

Sorokin, Yu. I., Kopylov, A. I., Mamaeva, N. V.
Abundance and dynamics of microplankton in the central tropical Indian Ocean 27–41

Marra, J., Heinemann, K., Landriau, G. Jr.
Observed and predicted measurements of photosynthesis in a phytoplankton culture exposed to natural irradiance 43–50

Riaux-Gobin, C.
Long-term changes in microphytobenthos in a Brittany estuary after the 'Amoco Cadiz' oil spill 51–56

Williams, S. L., Yarish, S. M., Gill, I. P.
Ammonium distributions, production, and efflux from backreef sediments, St. Croix, US Virgin Islands 57–64

Jørgensen, B. B., Sørensen, J.
Seasonal cycles of O_2, NO_3^- and SO_4^{2-} reduction in estuarine sediments: the significance of an NO_3^- reduction maximum in spring 65–74

Platt, H. M., Lambshead, P. J. D.
Neutral model analysis of patterns of marine benthic species diversity 75–81

Nichols, F. H., Thompson, J. K.
Persistence of an introduced mudflat community in South San Francisco Bay, California 83–97

Van Moorsel, G. W. N. M.
Disturbance and growth of juvenile corals (*Agaricia humilis* and *Agaricia agaricites*, Scleractinia) in natural habitats on the reef of Curaçao 99–112

Schweimanns, M., Felbeck, H.
Significance of the occurrence of chemoautotrophic bacterial endosymbionts in lucinid clams from Bermuda 113–120

Pipe, R. K.
Seasonal cycles in and effects of starvation on egg development in *Mytilus edulis* 121–128

Bryant, V., Newbery, D. M., McLusky, D. S., Campbell, R.
Effect of temperature and salinity on the toxicity of arsenic to three estuarine invertebrates *(Corophium volutator, Macoma balthica, Tubiflex costatus)* 129–137

Bryant, V., Newbery, D. M., McLusky, D. S., Campbell, R.
Effect of temperature and salinity on the toxicity of nickel and zinc to two estuarine invertebrates *(Corophium volutator, Macoma balthica)* 139–153

Russo, A. R.
Ecological observations on the gorgonian sea fan *Eunicella cavolinii* in the Bay of Naples 155–159

Fenaux, L., Cellario, C., Etienne, M.
Variations in the ingestion rate of algal cells with morphological development of larvae of *Paracentrotus lividus* (Echinodermata: Echinoidea) 161–165

Pregnall, A. M., Rudy, P. P.
Contribution of green macroalgal mats (*Enteromorpha* spp.) to seasonal production in an estuary 167–176

Townsend, D. W., Cammen, L. M.
A deep protozoan maximum in the Gulf of Maine 177–182

NOTES

Lester, R. T., Bak, B. P. M.
Effects of environment on regeneration rate of tissue lesions in the reef coral *Montastrea annularis* (Scleractinia) 183–185

Rochet, M., Legendre, L., Demers, S.
Acclimation of sea-ice microalgae to freezing temperature 187–191

Cadée, G. C.
Macroaggregates of *Emiliana huxleyi* in sediment traps 193–196

Bunt, J. S., Williams, W. T., Clay, H. J.
Detection of species sequences across environmental gradients 197–199

Cucci, T. L., Shumway, S. E., Newell, R. C., Selvin, R., Guillard, R. R. L., Yentsch, C. M.
Flow cytometry: a new method for characterization of differential ingestion, digestion and egestion by suspension feeders 201–204

Volume 24 · Number 3 · 1985

RESEARCH PAPERS

Coull, B. C.
Long-term variability of estuarine meiobenthos: an 11 year study 205–218

Coull, B. C., Dudley, B. W.
Dynamics of meiobenthic copepod populations: a long-term study (1973–1983) 219–229

Goldman, J. C., Caron, D. A., Andersen, O. K., Dennett, M. R.
Nutrient cycling in a microflagellate food chain: I. Nitrogen dynamics 231–242

Caron, D. A., Goldman, J. C., Andersen, O. K., Dennett, M. R.
Nutrient cycling in a microflagellate food chain: II. Population dynamics and carbon cycling 243–254

Feijtel, T. C., DeLaune, R. D., Patrick, W. H., Jr.
Carbon flow in coastal Louisiana 255–260

Young, G. A.
Byssus-thread formation by the mussel *Mytilus edulis:* effects of environmental factors 261–271

Wen Yuh Lee, Zhang, X. K., Van Baalen, C., Arnold, C. R.
Feeding and reproductive performance of the harpacticoid *Tisbe carolinensis* (Copepoda, Crustacea) in four algal cultures 273–279

Head, E. J. H., Harris, L. R., Abou Debs, C.
Effect of daylength and food concentration on *in situ* diurnal feeding rhythms in Arctic copepods 281–288

Shanks, A. L.
Behavioral basis of internal-wave-induced shoreward transport of megalopae of the crab *Pachygrapsus crassipes* 289–295

Dawirs, R. R.
Temperature and larval development of *Carcinus maenas* (Decapoda) in the laboratory; predictions of larval dynamics in the sea 297–302

NOTE

Haedrich, R. L.
Species number-area relationship in the deep sea 303–306